

# Balaji Prabhakar

## Journal Publications

1. N. Bambos, B. Prabhakar, "On infinite queueing tandems," *Systems & Control Letters*, 23(4):305-314, October 1994
2. T.S. Mountford, B. Prabhakar, "On the weak convergence of departures from an infinite series of  $M/M/1$  queues," *Annals of Applied Probability*, 5(1):121-127, February 1995
3. B. Prabhakar, T.S. Mountford, N. Bambos, "Convergence of departures in tandem networks of  $M/GI/\infty$  queues," *Probability in the Engineering and Informational Sciences*, 10:487-500, October 1996
4. B. Prabhakar, N. Bambos, "On a singular feature of critical  $G/M/1$  queues," *Systems & Control Letters*, 28(5):239-245, September 1996
5. T.S. Mountford, B. Prabhakar, "The Cesaro limit of departures from certain  $M/GI/1$  queueing tandems," *Stochastic Networks: Theory and Applications*, 4:309-322, F.P. Kelly, S. Zachary and I. Ziedins, eds., Royal Statistical Society Lecture Note Series, Clarendon Press, Oxford, September 1996
6. B. Prabhakar, N. McKeown, R. Ahuja, "Multicast scheduling for input-queued switches," *IEEE Journal on Selected Areas in Communications*, special issue on Advances in ATM Switching Systems for B-ISDN, 15(5):855-866, June 1997
7. S.-T. Chuang, A. Goel, N. McKeown, B. Prabhakar, "Matching output queueing with a combined input/output-queued switch," *IEEE Journal on Selected Areas in Communications*, special issue on Next Generation IP Switches and Routers, 17(6):1030-1039, June 1999
8. B. Prabhakar, N. McKeown, "On the speedup required for combined input and output queued switching," invited paper, *Automatica*, 35(12):1909-1920, December 1999
9. B. Prabhakar, N. Bambos, T.S. Mountford, "The synchronization of Poisson processes and queueing networks with service and synchronization nodes," *Advances in Applied Probability*, 32:824-843, September 2000
10. K. Psounis, R. Pan, B. Prabhakar, "Approximate fair dropping for variable length packets," by invitation, *IEEE Micro*, 21(1):48-56, January-February 2001
11. R. Pan, L. Breslau, B. Prabhakar, S. Shenker, "Approximate fairness through differential dropping (a summary)," *ACM Computer Communication Review*, 32(1):72, January 2002
12. P. Giaccone, D. Shah, B. Prabhakar, "An implementable parallel scheduler for input-queued switches," *IEEE Micro*, 22(1):19-25, January-February 2002
13. D. Shah, P. Giaccone, B. Prabhakar, "Efficient randomized algorithms for input-queued switch scheduling," *IEEE Micro*, 22(1):10-18, January-February 2002

14. D. Shah, S. Iyer, B. Prabhakar, N. McKeown, "Analysis of a statistics counter architecture," *IEEE Micro*, 22(1):76-81, January-February 2002
15. K. Psounis, B. Prabhakar, "Efficient randomized Web-cache replacement schemes using samples from past eviction times" *IEEE/ACM Transactions on Networking*, 10(4):441-454, August 2002
16. E. Uysal-Biyikoglu, B. Prabhakar, A. El Gamal, "Energy-efficient packet transmission over a wireless link," by invitation, *IEEE/ACM Transactions on Networking*, 10(4):487-499, August 2002
17. J. Mairesse, B. Prabhakar, "The existence of fixed points for the  $\cdot/GI/1$  queue," *Annals of Probability*, 31(4):2216-2236, 2003
18. B. Prabhakar, "The attractiveness of the fixed points of a  $\cdot/GI/1$  queue," *Annals of Probability*, 31(4):2237-2269, 2003
19. A.J. Ganesh, N. O'Connell, B. Prabhakar, "Invariant rate functions for discrete-time queues," *Annals of Applied Probability*, 13(2):446-474, 2003
20. R. Pan, B. Prabhakar, L. Breslau, S. Shenker, "Approximate fair allocation of link bandwidth," *IEEE Micro*, 23(1): 36-43, January-February 2003
21. K. Leyton-Brown, R. Porter, B. Prabhakar, Y. Shoham, S. Venkataraman, "Incentive mechanisms for smoothing out a focused demand for network resources," by invitation, *Computer Communications*, 26(3):237-250, February 2003
22. B. Prabhakar, R. Gallager, "Entropy and the timing capacity of discrete queues," *IEEE Transactions on Information Theory*, 49(2):357-370, February 2003
23. P. Giaccone, B. Prabhakar, D. Shah, "Randomized scheduling algorithms for high-aggregate bandwidth switches," *IEEE Journal on Selected Areas in Communications*, 21(4):546-559, May 2003
24. K. Psounis, A. Zhu, B. Prabhakar, R. Motwani, "Modelling correlations in Web-traces and implications for designing replacement policies," *Computer Networks Journal*, Elsevier, July 2004
25. P. Gupta, B. Prabhakar, S. Boyd, "Near-optimal depth-constrained codes," *IEEE Transactions on Information Theory*, 50(12):3294-3298, December 2004
26. R. Pan, K. Psounis, B. Prabhakar, D. Wischik, "SHRiNK: Enabling Scaleable Performance Prediction and Efficient Simulation of Networks," *IEEE Transactions on Networking*, 13(5):975-989, October 2005.
27. C. Nair, B. Prabhakar, M. Sharma, "Proofs of the Parisi and Coppersmith-Sorkin Random Assignment Conjectures," *Random Structures and Algorithms*, 27(4):413-444, October 2005.

## Conference Publications

1. A.V. Balakrishnan, B. Prabhakar, "Estimation of wind profile from laser beam propagation distortion," Seventh Annual Research Review Meeting of the NASA-UCLA Flight Systems Research Center, Los Angeles, Calif., 1992
2. T.S. Mountford, B. Prabhakar, "Convergence of departures from an infinite sequence of queues," *IMA Workshop on Stochastic Networks*, 1994, appears in *Stochastic Networks*, F. Kelly, R. Williams, eds., series: IMA Volumes in Mathematics and its Applications, 71:235-237, Springer Verlag, New York, 1995.
3. B. Prabhakar, T.S. Mountford, N. Bambos, "The asymptotics of traffic processes in large queueing networks," *Proceedings of the 32nd Annual Allerton Conference on Communication, Control and Computing*, pp.563-572, September 1994
4. B. Prabhakar, N. Bambos, "Entropy methods for high speed communications," *Proceedings of the Conference on Information Sciences and Systems*, pp.448-453, March 1995
5. B. Prabhakar, N. Bambos, "The entropy and delay of processes in ATM networks," *IEEE Information Theory Workshop on Information Theory, Multiple Access and Queueing*, 1995
6. B. Prabhakar, N. McKeown, "Designing a multicast switch scheduler," *Proceedings of the 33rd Annual Allerton Conference on Communication, Control and Computing*, pp.984-993, October 1995
7. N. McKeown, B. Prabhakar, "Scheduling multicast cells in an input-queued switch," *Proceedings of IEEE INFOCOM Conference on Computer Communications*, 1:271-278, March 1996
8. B. Prabhakar, N. McKeown, J. Mairesse, "Tetris models for multicast switches," *Proceedings of the 30th Annual Conference on Information Sciences and Systems*, 1:216-221, March 1996
9. N. McKeown, B. Prabhakar, M. Zhu, "Matching output queueing with combined input and output queueing," *Proceedings of the 35th Annual Allerton Conference on Communications, Control and Computing*, pp.595-603, September 1997
10. A.J. Ganesh, N. O'Connell, B. Prabhakar, "A large deviations characterization of the fixed point of a  $\cdot/G/1$  queue," by invitation, *Proceedings of the IEEE Information Theory Workshop*, pp.143-144, June 1998
11. B. Prabhakar, N. McKeown, "On the speedup required for combined input and output queued switching," *Proceedings of the IEEE International Symposium on Information Theory*, p.165, August 1998
12. B. Prabhakar, N. Bambos, T.S. Mountford, "On the synchronization of Poisson processes and queueing networks with service and synchronization nodes," *Stanford University Computer Science Department Technical Report*, STAN-CS-TR-98-1613, October 1998.
13. S.T. Chuang, A. Goel, N. McKeown, B. Prabhakar, "Matching output queueing with a combined input output queued switch," *Proceedings of IEEE INFOCOM Conference on Computer Communications*, 3:1169-1178, March 1999

14. R. Gallager, B. Prabhakar, "Entropy and the Shannon capacity of queueing systems," by invitation, *Proceedings of the IEEE Information Theory and Communications Workshop*, p.1, June 1999
15. R. Gallager, B. Prabhakar, "The entropies of queue arrivals and queue departures," by invitation, *Proceedings of the Information Theory and Networking Workshop*, p.42, June 1999
16. B. Prabhakar, P. Gupta, S. Boyd, "A two-bit scheme for routing lookup," *Proceedings of the Information Theory and Networking Workshop*, p.45, June 1999
17. B. Prabhakar, R. Pan, "CHOKe — A stateless mechanism for providing quality of service in the Internet," *Proceedings of the 37th Allerton Conference on Communication, Control and Computing*, pp.1122-1131, September 1999.
18. A.J. Ganesh, N. O'Connell, B. Prabhakar, "Invariant rate functions for discrete time queues," *37th Annual Allerton Conference on Communication, Control and Computing*, pp.288-296, September 1999
19. A. Goel, B. Prabhakar, "Stochastic analysis of stable marriages in combined input output queued switches," by invitation, *Proceedings of the 38th IEEE Conference on Decision and Control*, 3:3096-3101, December 1999
20. K. Psounis, B. Prabhakar, D. Engler, "A randomized cache replacement approximating LRU," *Proceedings of the Conference on Information Sciences and Systems*, 2:FA05, March 2000
21. J. Dai, B. Prabhakar, "The throughput of data switches with and without speedup," *Proceedings of IEEE INFOCOM Conference on Computer Communications*, 2:556-564, March 2000
22. P. Gupta, B. Prabhakar, S. Boyd, "Near-optimal routing lookups with bounded worst case performance," *Proceedings of IEEE INFOCOM Conference on Computer Communications*, pp.1184-1192, March 2000.
23. R. Pan, B. Prabhakar, K. Psounis, "CHOKe — a stateless active queue management scheme for approximating fair bandwidth allocation," *Proceedings of IEEE INFOCOM Conference on Computer Communications*, pp.942-951, March 2000
24. K. Psounis, R. Pan, B. Prabhakar, "An approximate fair dropping scheme for variable length packets," *Proceedings of Hot Interconnects 8 Symposium on High Performance Interconnects*, August 2000.
25. B. Prabhakar, E. Uysal-Biyikoglu, A. El Gamal, "Energy-efficient transmission over a wireless link via lazy packet scheduling," *Proceedings of IEEE INFOCOM Conference on Computer Communications*, pp.386-394, April 2001
26. K. Psounis, B. Prabhakar, "A randomized Web-cache replacement scheme," *Proceedings of IEEE INFOCOM Conference on Computer Communications*, pp.1407-1415, April 2001
27. B. Prabhakar, R. Gallager, "Entropy and the timing capacity of discrete queues," *Proceedings of the IEEE International Symposium on Information Theory*, p.228, June 2001

28. D. Shah, S. Iyer, B. Prabhakar, N. McKeown, "Analysis of a statistics counter architecture," *Proceedings of Hot Interconnects 9 Symposium on High Performance Interconnects*, pp.107-111, August 2001
29. D. Shah, P. Giaccone, B. Prabhakar, "An efficient randomized algorithm for input-queued switch scheduling," *Proceedings of Hot Interconnects 9 Symposium on High Performance Interconnects*, pp.3-8, August 2001
30. P. Giaccone, D. Shah, B. Prabhakar, "An implementable parallel scheduler for input-queued switches," *Proceedings of Hot Interconnects 9 Symposium on High Performance Interconnects*, pp.9-14, August 2001
31. C. Nair, B. Prabhakar, D. Shah, "The randomness in randomized load balancing," by invitation, *Proceedings of the 39th Annual Allerton Conference on Communication, Control and Computing*, pp.912-921, October 2001
32. R. Pan, C. Nair, B. Yang, B. Prabhakar, "Packet dropping schemes, some examples and analysis," by invitation, *Proceedings of the 39th Annual Allerton Conference on Communication, Control and Computing*, pp.563-572, October 2001
33. K. Leyton-Brown, R. Porter, S. Venkataraman, B. Prabhakar, "Smoothing out focused demand for network resources," *Proceedings of the ACM Conference on Electronic Commerce*, pp.245-248, October 2001
34. P. Giaccone, B. Prabhakar, D. Shah, "Towards simple, high-performance schedulers for high-aggregate bandwidth switches," *Proceedings of IEEE INFOCOM Conference on Computer Communications*, 21(1):1160-1169, June 2002
35. D. Shah, B. Prabhakar, "The use of memory in randomized load balancing," *Proceedings of the IEEE International Symposium on Information Theory*, p. 125, June 2002
36. A. El Gamal, C. Nair, B. Prabhakar, E. Uysal-Biyikoglu, S. Zahedi, "Energy-efficient scheduling of packet transmissions over wireless networks," *Proceedings of IEEE INFOCOM Conference on Computer Communications*, 21(1):1773-1782, June 2002
37. R. Pan, L. Breslau, B. Prabhakar, S. Shenker, "Flow table-based design to approximate fairness," *Proceedings of Hot Interconnect 10 Symposium on High Performance Interconnects*, pp.37-42, August 2002
38. R. Pan, B. Prabhakar, K. Psounis, M. Sharma, "A study of the applicability of a scaling hypothesis," by invitation, *Proceedings of the 4th Asian Control Conference*, September 2002
39. M. Sharma, B. Prabhakar, "On Parisi's conjecture for the random assignment problem," by invitation, *Proceedings of the 40th Annual Allerton Conference on Communication, Control and Computing*, pp.657-666, October 2002
40. M. Mitzenmacher, B. Prabhakar, D. Shah, "Load balancing with memory," *Proceedings of the 43rd Annual IEEE Symposium on Foundations of Computer Science*, pp.799-808, November 2002

41. P. Giaccone, E. Leonardi, B. Prabhakar, D. Shah, "Delay performance of high-speed packet switches with low speedup," *Proceedings of the IEEE Global Telecommunications Conference, GLOBECOM*, 21(1):2636-2640, November 2002
42. E. Uysal-Biyikoglu, A. El Gamal, B. Prabhakar, "Adaptive transmission of variable-rate data over a fading channel for energy-efficiency," *Proceedings of the IEEE Global Telecommunications Conference, GLOBECOM*, 21(1):98-102, November 2002
43. P. Giaccone, B. Prabhakar, D. Shah, "Switching under energy constraints," *Proceedings of the 36th Asilomar Conference on Signals, Systems and Computers*, 2:1538-1542, November 2002
44. C. Nair, B. Prabhakar, M. Sharma, "Proofs of the Parisi and Coppersmith-Sorkin conjectures for the finite random assignment problem," *Proceedings of the 44th Annual IEEE Symposium on Foundations of Computer Science*, pp.168-178, October 2003
45. K. Psounis, R. Pan, B. Prabhakar, D. Wischik, "The scaling hypothesis: simplifying the prediction of network performance using scaled-down simulations," by invitation at HotNets-1, October 2002, appears in *ACM Computer Communication Review*, 33(1):35-40, January 2003
46. R. Pan, B. Prabhakar, K. Psounis, D. Wischik, "SHRiNK: A method for scaleable performance prediction and efficient network simulation," *Proceedings of IEEE INFOCOM Conference on Computer Communications*, 22(1):1943-1953, March 2003
47. A. El Gamal, J. Mammen, B. Prabhakar, D. Shah, "Throughput-delay trade-off in wireless networks," *Proceedings of IEEE INFOCOM Conference on Computer Communications*, 23(1):464-475, March 2004
48. A. El Gamal, J. Mammen, B. Prabhakar, D. Shah, "Throughput-delay trade-off in energy constrained wireless networks," *Proceedings of the IEEE International Symposium on Information Theory*, p.439, June 2004
49. C. Nair, B. Prabhakar, M. Sharma, "A new proof of Parisi's conjecture for the finite random assignment problem," *Proceedings of the IEEE International Symposium on Information Theory*, p.61, June 2004
50. M. Sharma, D. Katabi, R. Pan, B. Prabhakar, "An in-band easy-to-deploy mechanism for network-to-transport signaling," *Proceedings of the IEEE Global Telecommunications Conference, GLOBECOM*, 2:1278-1283, November 2004
51. S. Boyd, A. Ghosh, B. Prabhakar, D. Shah, "Analysis and optimization of randomized gossip algorithms," *Proceedings of the 43rd IEEE Conference on Decision and Control*, 5:5310-5315, December 2004